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THE KUROSHIO/TOPOGRAPHY INTERACTION IN THE WESTERN NORTH PACIFIC

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RESEARCH GOALS

The western boundary region of the North Pacific Ocean is unique in that it is porous. Massive exchanges between the Pacific and the marginal seas occur through gaps in the island chain that bounds the open basin. The long term goal of the proposed work is to understand the dynamics of these exchanges and their consequences in terms of ocean variability.

OBJECTIVES

The dynamics of mesoscale flow features that arise from the disruption of the Kuroshio by the continental margin topography in the East China Sea continues to be the focus of the research project. The purpose of the research is to seek an indepth understanding of the dynamics and ramifications of these features.

APPROACH

The examination and interpretation of current-meter, hydrographic, and remote-sensing data collected by Taiwan, Korea, and Japan have continued. In addition, an eddy resolving, general circulation model of the Asian marginal seas is being constructed to address specific dynamic issues of the circulation concerning the Kuroshio/topography interaction. The effort is continued to understand the way the Kuroshio intrudes into and then exit the Luzon Strait.

WORK COMPLETED

To take advantage of considerable current measurements which have begun to become available, an eddy-resolving model of the South China Sea, similar to the expanded Asian marginal seas (AMS) model reported before, has been constructed to study the intrusion of the Kuroshio in the Luzon Strait. Qualitative model/observation comparisons point to an overall agreement and the importance of winds in generating the observed surface current patterns.

RESULTS

1. Qualitative comparisons between model outputs and altimeter derived geostrophic velocity normal to a nearly north-south oriented satellite track across the Luzon Strait loop current indicate the model reproduces the overall feature of the loop current, but misses the strong inflow into the South China Sea found at the northern and southern ends of the track. These areas of inflows are obviously associated coastal currents driven by a north wind prevalent during the week (December 29, 1993 - January 4, 1994) when the altimetry data were obtained.

2. A small leakage of Kuroshio water into the Taiwan Strait is detected in the model. The leakage is found to contribute about half of the total northward volume transport of 0.6 Sv (1 Sv = 10^6 m³/sec) found in the model Taiwan Strait.

IMPACT/APPLICATIONS

The qualitative agreement of the South China Sea the geostrophic velocity derived from the altimetry data suggests that a working model is in hand for the construction of a model of the Kuroshio intrusion in the Luzon Strait. The foundation is thus in place for a study of the effect of the wind-driven circulation of the South China Sea proper on the exchange of water mass across the Luzon Strait and the northward penetration of Kuroshio water into the Taiwan Strait.

TRANSITIONS

None.

RELATED PROJECTS

None.

REFERENCES

None.